

sure that had been drifting slowly eastward for several days prior to October 16. During this period warm, humid air from the Caribbean Sea and the Gulf of Mexico had been steadily moving northward over the Mississippi Valley, while a high from the Pacific Ocean had been advancing eastward over the Plateau and Rocky Mountain regions, bringing cooler air down the eastern slope of the Rockies and over western Texas by 8 a. m. of the 16th. The kite flight at Groesbeck, Tex. (started at 5:54 a. m.), shows that there had been an increase in both humidity and temperature up to 2 kilometers above the surface, and a slight decrease in temperature at the top of the flight (about 2,300 meters above the surface) since the flight 24 hours previously. This con-

dition, increase of the lapse rate and of the humidity below the 2-kilometer level, rendered the air quite unstable and made the conditions favorable for active convection and the development of more or less violent thunderstorms a little later in the day in eastern Texas.

The air movement being from southwest to northeast, this same condition extended rapidly northeastward over Arkansas and extreme western Tennessee during the day. It was in the late afternoon that conditions quite similar to those shown by the Groesbeck kite flight set in over extreme western Tennessee and resulted in the violent thunderstorms experienced by the *RS-1*.—*Chas. L. Mitchell*.

## CONICAL SNOW

By WILSON A. BENTLEY

Every late autumn and early spring there occur at Jericho, in northern Vermont, and of course at other similar locations, several falls of conical snow, and also an occasional one in winter. This sort of snow comes only out of cumulo-nimbus clouds, and more commonly when the surface temperature ranges from 34° to 44° F. Conical snowflakes have a granular texture and are built up mainly from countless undercooled cloud droplets that have frozen loosely together. Their greatest diameter ranges from one-sixth to one-third inch. The writer assumes, from a long-time study of this form of snow, that the nuclei usually, if not invariably, consist of branching tabular crystals.

It is of much interest to consider the conditions within a cumulus cloud that conspire to make the undercooled droplets so arrange themselves upon a tabular snow crystal as to form a granular snow cone. It is certain that, owing to its lightness, a tabular branching snow crystal within a cumulo-nimbus cloud, is first wafted upward and about by turbulent air currents. This

causes it to become thickly coated on both sides with frozen cloud droplets, or granular snow. It now begins to fall with the denser side turned downward, and since it falls faster than the cloud droplets light granular material then rapidly collects on (is caught by) the under face thereby destroying the former gravitational equilibrium of the mass and causing it to upset, whereupon the granular snow is caught exclusively, or nearly so, by the new underside, and thus the whole converted into a more or less well-defined double cone with its abutting bases on the opposite sides of the initial tabular crystal. It is conceivable, given a cumulo-nimbus cloud of sufficient thickness, that additional upsettings might occur and thus cause the double cone to become more nearly symmetrical about its basal plane than it otherwise would be.

NOTE.—The phenomenon here described is much like, if not identical with, soft hail or graupel—free-air wads of rime, presumably, built up on snow crystals.—*Editor*.

## ALFRED JUDSON HENRY, 1858–1931

Those of us who have had the privilege of watching the development of Government institutions can not fail to realize that the character of their personnel has been a potent factor in determining policies and attainments. Usually a few outstanding men have played a major part in this formative work.

The Weather Bureau has been fortunate that among its officials have been many men who sought not position but opportunity to do useful work. The subject of this notice is an outstanding example of a public benefactor of this type. Born in New Bethlehem, Pa., on September 1, 1858, he enlisted in the meteorological section of the Signal Corps, U. S. Army, in July, 1878, while in his twentieth year. Having finished the usual course of instruction in military tactics and meteorology at Fort Whipple, now Fort Myer, Va., and being exceptionally efficient as a telegraph operator, he was detailed for duty on military telegraph lines, first on the Atlantic Coast, and later on the then frontier in Texas. This was an unpleasant and difficult assignment, but in two years he had won a sergeancy, and in 1883 was called to Washington for duty in the office of the Chief Signal Office. In October, 1888, the Central Office force was given a civilian status, and from that time on Henry's advancement was rapid. In 1900 he was promoted to the position of Professor of Meteorology, and when this grade was abolished in 1910 his designation became simply

Meteorologist. Later under classification of Federal employees he was advanced successively to Senior Meteorologist and Principal Meteorologist, which latter title he held until the time of his death on October 5, 1931.

Professor Henry held many important assignments, in the Weather Bureau, such as Chief of Meteorological Records Division, Chief of the River and Floods Division, Official Forecaster at Washington, in Charge of the Research Observatory at Mount Weather, Va., and finally, Editor of the Monthly Weather Review. He also was a member of numerous Weather Bureau boards that had to do with the shaping of Bureau policies.

Professor Henry was educated in the common schools, with one year in high school and one year in Reid Institute, Reidsburg, Pa. He also studied for two years at the Columbian University (now George Washington) in Washington, D. C.

He was author of several important works: "Rainfall in the United States," "Climatology of the United States"; "Weather Forecasting from synoptic charts"; "Weather Forecasting in the United States" (co-author); "The Floods of 1913 in the rivers of the Ohio and lower Mississippi Valley"; "Upper Air Investigations at Mount Weather, Va.," and numerous papers on various phases of climatology and kindred subjects.

Professor Henry's fellow workers will cherish his memory, not alone for his scientific attainments, but